[redacted] [redacted]

September 18, 2018

The new chemical substance (NCS), known as [redacted] is synthesized by reaction of [redacted]. The resulting polymer is a [redacted] solution of a resin in a mixture of solvent naphtha (petroleum), light aromatic, and butyl acetate. It contains trimethoxysilyl groups.

[redacted] had a presubmission meeting with EPA on [redacted] the case was assigned prenotice communication number [redacted]. One of the issues discussed was possible categories of concern applicable to [redacted] Three categories of concern were considered:

- Alkoxysilanes
- Waterproofing agents, silanes subcategory
- Polymer lung overload

To address applicability of waterproofing agents' category to [redacted] performed capillary surface tension test on this product. The results are shown in Attachment 1.

Surface tension properties of [redacted] silicone resin, 0.5 wt. % in water, were tested on a Kruss K100 Force Tensiometer, using the plate method. The sample of [redacted] was not completely soluble in water after 1 hour of mixing at room temperature—in addition to a thin layer of the solvent on the top, a separate heavy droplets formed on the bottom of the mixture, and the aqueous phase was opaque.

The surface tension of the sample was determined as 49.50 Dynes/cm, which is less than the surface tension of water, 72 Dynes/cm. As waterproofing agents *increase* the surface tension of water, [redacted] is not a waterproofing agent.

Conversely, the observed reduction of the water surface tension is not large enough to consider [redacted] a potential surfactant. The definition of "organic surface-active agents" is given in the Harmonized Tariff Schedule of the United States (2010), Chapter 34, as follows:

> For the purposes of heading 3402, "organic surface-active agents" are products which when mixed with water at a concentration of 0.5 percent at 20°C and left to stand for one hour at the same temperature:
>
> (a) Give a transparent or translucent liquid or stable emulsion without separation of insoluble matter; and
> (b) Reduce the surface tension of water to 4.5 x 10-2 N/m (45 dyne/cm) or less.

Viewed against the definition, [redacted] is not a surface-active (surfactant) agent—it fails on both criteria.

Regarding polymer lung overload, the definition given in the EPA draft guidance refers to high molecular weight materials typically formed through a free-radical polymerization process, and all examples from the draft guidance are solids. As [redacted] is neither, it does not belong to polymer lung overload category.

Thus, in [redacted] opinion, the only category of concern applicable to [redacted] is alkoxysilanes.

[redacted] [redacted]

The major exposure concern associated with [redacted] results from application as a binder in paints, which are applied to surfaces by rolling, brushing, or spraying. To assess this hazard, [redacted] carried out a spray droplet size distribution study, using a typical paint formulation made from [redacted]

Setting up the study, [redacted] attempted to model a worst-case scenario in the application of [redacted] which would be a Do-It-Yourself (DIY) spray application. In order for the droplet size distribution study to be relevant and meaningful, we had to prepare a typical clear paint formulation having viscosity on a lower end of the customary range, which would provide the droplets of smallest size expected, and use spraying equipment and pressure range typical for DIY spraying. The sample paint prepared for testing had the name [redacted] assigned to it.

The methods for achieving the [redacted]s spray viscosity for airless spray application was based on an existing commercial coating technology, Benjamin Moore's BENWOOD STAYS CLEAR® Acrylic Polyurethane High Gloss 422. According to the Benjamin Moore's Technical Data Sheet (Attachment 2), this coating can be applied through "Do It Yourself" Airless Spray equipment. This system was used as a model only, as discussed further below, [redacted] does not expect this resin to be used in DIY coatings, only in high-performance industrial and commercial coatings that will be applied by professionals.

[redacted] used Benjamin Moore's BENWOOD STAYS CLEAR® Acrylic Polyurethane High Gloss 422 package viscosity, as shown on their Technical Data Sheet, as the starting point for [redacted]s package viscosity. The viscosity on the Benjamin Moore Technical Data Sheet was 72 $\pm$ 2 Krebs Unit. The Krebs Units viscosity was converted to CentiPoise viscosity using Brookfield KU-2 Viscometer Operating Instructions, Manual No. M04-242-D0612. 72 $\pm$ 2 KU converts to approximately 607 $\pm$ 50 centipoise.

In order to produce a worst-case low viscosity scenario that would generate small particle spray droplets, the [redacted] was diluted with solvent already present in the product formulation, solvent naphtha (petroleum), light aromatic (trade name Solvesso 100). The aim was to produce a resin formulation with the viscosity between 500 to 550 cps, which is the low end for airless spray application. The [redacted] formulation comprised 29.0 grams of Solvesso 100 and 71.0 grams of [redacted] and has the following composition:

[redacted]

The room temperature viscosity of [redacted] was measured at approximately 540 centipoise. A half gallon of [redacted] was then prepared for spray application for particle size droplet analysis.

Based on the Benjamin Moore's Technical Data Sheet, the BENWOOD STAYS CLEAR® Acrylic Polyurethane High Gloss 422 can be sprayed using airless spray equipment. That equipment would be preferential for [redacted] based resins because of the moisture sensitive nature of [redacted] The

[redacted] [redacted]

recommended Fluid Pressure was between 1,500 to 2,000 psi and the recommended tip orifice was between 0.011 and 0.015 inches.

The testing of [redacted] was done by the Spray Analytics Inc. Laboratory, using Malvern Sparytec laser diffraction system MAL1055256. The full report is enclosed as Attachment 3.

Spray Analytics used a Graco Medium Duty Paint Sprayer, available from Home Depot for airless spraying; two recommended spraying nozzles, 515 (larger) and 411 (smaller), and three pressure settings at 1,600 psi, 2,100 psi, and 2,600 psi (low, medium, and high).

The results are discussed in the report. Several important outcomes are:

1. Droplet size distribution is very consistent.
2. The majority of distribution is out of a respirable range.
3. As expected, the highest pressure produces the smallest droplet size.
4. Droplet size is largely independent of the orifice size. This effect is possibly due to the resin characteristics.
5. The amount of droplet sizes under 10 µm ranged from 0.2% to 2.9%. The smaller, 411 nozzle at high pressure produced the highest percentage of respirable particles.
6. Across all tests, the lowest Dv(10) is 27.4 µm --this means that in the measured "worst case", only 10 percent of the droplets were smaller than 27.4 µm.

These measurement support a conclusion that even in DIY spray coating, there will not be significant exposure to respirable droplets.

As stated above, [redacted] does not plan to promote [redacted] for DIY applications. The resin is intended to be used in paints for high-performance industrial and commercial applications. Using them in DIY market is not expected because:

- [redacted] is a high-end, high-priced product. It provides specific properties, such as corrosion protection, chemical and UV resistance. These properties are critical for its use on outdoor structures subject to harsh conditions (ships, marine oil rigs).
- [redacted] is limited to use in solvent-borne paints.
- Expected price point $20-25/kg, compared to $4-6/kg price of binders in paints for consumer use.

[redacted]